IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	: 10/535,735	Confirm. No.	: 2702
First Inventor	: Harald GUNNE		
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TC/A.U.	: 3683		
Examiner	: James K. HSIAO		
Docket No.	: 095309.56285US		
Customer No.	: 23911		

Title : Method and Device for Stabilizing a Vehicle Combination

APPEAL BRIEF (AMENDED)

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This amended appeal brief is filed following receipt of the Notification of Non-Compliant Appeal Brief dated December 2, 2008. As this document is being filed within the one month/thirty day period set on the Notification referred to, no additional fee should be due.

Real party in interest

The real party in interest is Daimler AG of Stuttgart, Germany, by way of an assignment recorded in the U.S. Patent and Trademark Office assignment records at reel 020976, frame 0889.

Related appeals and interferences

The undersigned is unaware of any interferences, judicial proceedings, or other prior or pending appeals that may be related to, directly affect or be affected by, or have a bearing on a decision in this appeal.

Status of claims

Claims 30-36 and 42-56 are pending in this application, are rejected, and are now appealed. Claims 1-29 were canceled by way of the preliminary amendment filed May 20, 2005, while claims 37-41 were canceled by way of the second amendment after final rejection filed August 20, 2008.

Status of amendments

Two amendments were submitted subsequent to the final rejection dated February 7, 2008. By way of the advisory action dated July 2, 2008, the undersigned is advised that the first of these amendments, filed May 30, 2008, has not been entered. The second

of these amendments, filed August 20, 2008, will be entered in accordance with the advisory action dated September 5, 2008.

Summary of claimed subject matter

A concise explanation of the subject matter defined in the claims on appeal will now be provided. This explanation refers, by way of example only and without intending to limit the claims, to page, paragraph, and line numbers of the substitute specification filed May 20, 2005, and to the drawing figures of this application, as well as to certain elements illustrated in those drawing figures.

Independent claim 30

As defined in claim 30, the present invention concerns a method for stabilizing a vehicle combination 104 of a trailer or semi-trailer 102 and a towing vehicle 101 having front wheels 103vl, 103vr and rear wheels 103hl, 103hr (see, for example, page 1, paragraph 0002, lines 1-3, pages 21-22, paragraph 0059, lines 2-11, page 22, paragraph 0060, lines 1-10, and Figure 1).

Dynamic movement input variables Delta_Gier_PID, LW_Diff, and speed v of the vehicle combination 104 are determined, by way of

the elements represented by blocks 401 and 402 in Figures 4 and 5a-5d, and a speedometer or other vehicle speed detector, and evaluated, by interrogations A1 and A2 in detection logic circuit 301, (see, for example, pages 32-34, paragraph 0083, lines 1-13, paragraph 0084, lines 1-8, paragraph 0085, lines 1-13, paragraph 0086, lines 1-11, paragraph 0087, lines 1-8, and paragraph 0088, lines 1-3).

Brake devices (not shown) are provided for implementing, upon receipt of actuation signals EIN_P_SOLL_VL and EIN_P_SOLL_VR from blocks 701 and 702 of Figure 7b, braking interventions at the front wheels 103vl, 103vr of the towing vehicle 101 to stabilize a dynamic movement state of the vehicle combination 104 (see, for example, pages 39-41, paragraph 0101, lines 1-8, paragraph 0102, lines 1-6, paragraph 0103, lines 1-8, paragraph 0104, lines 1-3, paragraph 0105, lines 1-5, paragraph 0106, lines 1-9, Figure 7b mentioned above, and Figure 8a). Those braking interventions at the front wheels 103vl, 103vr of the towing vehicle 101 are implemented when a rolling movement, *i.e.* the unstable state of the vehicle combination 104 referred to in paragraph 0003, is detected upon evaluating the dynamic movement input variables Delta_Gier_PID, LW_Diff, and the speed v of the vehicle combination.

As noted on pages 27-28, in lines 1-9 of paragraph 0074, for example, and as is apparent from Figure 1, the braking interventions at the front wheels 103vl, 103vr of the towing vehicle 101 produce a yaw moment that counteracts the rolling movement, *i.e.* the unstable state referred to in paragraph 0003, of the vehicle combination 104.

Finally, as noted, for example, on page 9, in lines 4-12 of paragraph 0023, braking interventions for the rear wheels 103hl, 103hr of the towing vehicle 101 that effect essentially constant braking at the rear wheels are additionally permitted only when a predefined operating state of the vehicle combination 104 is present; such an operating state could, for example, be the unstable state produced by the low underlying surface coefficient of friction noted in 0075.

Independent claim 56

As defined in claim 56, the present invention concerns a device for stabilizing a vehicle combination 104 including a trailer 102 and a towing vehicle 101 that has front wheels 103vl, 103vr and rear wheels 103hl, 103hr (see, for example, page 1, paragraph 0002, lines

1-3, pages 21-22, paragraph 0059, lines 2-11, page 22, paragraph 0060, lines 1-10, and Figure 1).

The vehicle combination stabilizing device has "means," including the elements represented by blocks 401 and 402 in Figures 4 and 5a-5d, a speedometer or other vehicle speed detector, and detection logic circuit 301, for determining and evaluating, by interrogations A1 and A2 in detection logic circuit 301, the dynamic movement input variables Delta_Gier_PID, LW_Diff, and the speed v of the vehicle combination 104 (see, for example, pages 32-34, paragraph 0083, lines 1-13, paragraph 0084, lines 1-8, paragraph 0085, lines 1-13, paragraph 0086, lines 1-11, paragraph 0087, lines 1-8, and paragraph 0088, lines 1-3).

The vehicle combination stabilizing device also includes "means," including brake devices (not shown), for implementing, by way of actuation signals EIN_P_SOLL_VL and EIN_P_SOLL_VR from blocks 701 and 702 of Figure 7b, braking interventions at the front wheels 103vl, 103vr of the towing vehicle 101 to stabilize a dynamic movement state of the vehicle combination 104 (see, for example, pages 39-41, paragraph 0101, lines 1-8, paragraph 0102, lines 1-6, paragraph 0103, lines 1-8, paragraph 0104, lines 1-3,

paragraph 0105, lines 1-5, paragraph 0106, lines 1-9, Figure 7b mentioned above, and Figure 8a). Those braking interventions at the front wheels 103vl, 103vr of the towing vehicle 101 are implemented when a rolling movement, *i.e.* the unstable state of the vehicle combination 104 referred to in paragraph 0003, is detected upon evaluating the dynamic movement input variables Delta_Gier_PID, LW_Diff, and the speed v of the vehicle combination.

Again, as noted on pages 27-28, in lines 1-9 of paragraph 0074, for example, and as is apparent from Figure 1, the braking interventions at the front wheels 103vl, 103vr of the towing vehicle 101 produce a yaw moment that counteracts the rolling movement, *i.e.* the unstable state referred to in paragraph 0003, of the vehicle combination 104.

Finally, as noted, for example, on page 9, in lines 4-12 of paragraph 0023, braking interventions for the rear wheels 103hl, 103hr of the towing vehicle 101 that effect essentially constant braking at the rear wheels are additionally permitted only when a predefined operating state of the vehicle combination 104 is present; such an operating state could, for example, be the unstable state

produced by the low underlying surface coefficient of friction noted in 0075.

Ground of rejection to be reviewed on appeal

The sole ground of rejection to be reviewed is whether independent claim 30, independent claim 56, and claims 31-36 and 42-55, which depend on claim 30, are properly rejected under 35 U.S.C. § 102(b) as anticipated by German document DE 100 65 724 A1 to Leimbach et al. As noted by the Examiner in section 4 on page 3 of the final Office Action dated February 7, 2008, U.S. Patent application publication 2004/0080209 A1 is utilized as an English translation of the German document relied on.

Argument

Rejection under 35 U.S.C. § 102(b) over German document DE 100 65 724 A1 to Leimbach et al.

1. Claims 30-36 and 42-55

The brake regulating system forming the subject matter of the Leimbach et al. document relied on does not perform a vehicle

combination stabilizing method including the particular "producing" and "implementing" acts or operations required by claim 30.

As argued previously, there is nothing to suggest that the Leimbach et al. system utilizes any specific way of braking wheels of a towing vehicle. The U.S. Patent application publication corresponding to the Leimbach et al. document relied on, in fact, mentions nothing beyond the possibility of wheel individual braking. Claim 30 requires that yaw moment is produced via braking the front wheels of the towing vehicle; additional braking interventions (brake moments) can be applied to the towing vehicle rear wheels, but braking of the rear wheels is done, under certain conditions only and in an essentially constant manner, to reduce the speed of the vehicle combination. Braking of the rear wheels according to the method of claim 30, in other words, is performed essentially constantly with no oscillating braking intervention, so that that yaw movement is thus realized only by braking of the front wheels. These features are reflected by the "producing" and "implementing" limitations in claim 30. The Leimbach et al disclosure fails to meet the limitations in claims 30 noted, and the anticipation rejection based on the Leimbach et al. document is erroneous.

In rejecting claim 30, the Examiner places particular emphasis on the description provided by paragraph 0031 in the U.S. publication corresponding to the Leimbach et al. ('724) document. This paragraph explicitly describes the function of determining manipulated variables for individual brake pressures, thereby taking sensor values such as yaw rate, transverse acceleration, and roll angle into consideration. There is nothing in paragraph 0031 or elsewhere in the Leimbach et al. publication addressing the manner in which the wheel individual brake pressures are determined. More precisely, there is nothing that suggests the Leimbach et al. brake regulating system performs a stabilizing method including the yaw movement producing act or operation or the braking intervention implementing act or operation particularly defined by claim 30. Again, these features are reflected by the "producing" and "implementing" limitations in claim 30. According to the present invention, brake pressures at the front wheels and brake pressures at the rear wheels are determined so that the brake pressures at the front wheels produce oscillating brake interventions, generating a counter yaw moment, as described in paragraph 0024 of this

application, as well as brake pressures at the rear wheels that are essentially constant and, therefore, non-oscillating.

The rejection of independent claim 30, and claims 31-36 and 42-55, which depend on claim 30, over the Leimbach et al. document is erroneous for reasons set forth above.

2. Claim 56

The Leimbach et al. brake regulating system also does not produce a yaw moment that counteracts a vehicle combination rolling movement or braking interventions that effect essentially constant braking at rear wheels under the conditions specified in the final two clauses of claim 56.

Claim 56 above requires that yaw moment is produced via braking the front wheels of the towing vehicle; additional braking interventions (brake moments), again, can be applied to the towing vehicle rear wheels, but braking of the rear wheels is done, under certain conditions only and in an essentially constant manner, to reduce the speed of the vehicle combination. Braking of the rear wheels by way of the device defined by claim 56, in other words, is performed essentially constantly with no oscillating braking

intervention, so that that yaw movement is thus realized only by braking of the front wheels. These features are reflected by the "wherein" clauses appearing in claim 56. The Leimbach et al disclosure fails to meet the limitations in claim 56 noted, and the anticipation rejection of claim 56 based on the Leimbach et al. document is erroneous.

Again, in rejecting claim 56, the Examiner places particular emphasis on the description provided by paragraph 0031 in the U.S. publication corresponding to the Leimbach et al. ('724) document. As noted above in connection with the discussion of claim 30, this paragraph explicitly describes the function of determining manipulated variables for individual brake pressures, thereby taking sensor values such as yaw rate, transverse acceleration, and roll angle into consideration. There is nothing in paragraph 0031 or elsewhere in the Leimbach et al. publication addressing the manner in which the wheel individual brake pressures are determined. More precisely, there is nothing to suggest, in the Leimbach et al. system, that front wheel braking interventions produce a yaw moment or that rear wheel braking interventions are permitted in the way particularly defined by claim 56. Again, these features are reflected

by the limitations set forth in the "wherein" clauses appearing in claim 56. According to the present invention, brake pressures at the front wheels and brake pressures at the rear wheels are determined so that the brake pressures at the front wheels produce oscillating brake interventions, generating a counter yaw moment, as described in paragraph 0024 of this application, as well as brake pressures at the rear wheels that are essentially constant and, therefore, non-oscillating.

The rejection of independent claim 56 over the Leimbach et al. document is erroneous for reasons set forth above.

Conclusion

For reasons set forth above, appellants respectfully submit that the rejection of claims 30-36 and 42-56 based on German document DE 100 65 724 A1 set forth in the final rejection dated February 7, 2008, is improper and should be reversed.

If there are any questions regarding this amended appeal brief or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an extension of time sufficient to effect a timely response. Please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #095309.56285US).

Respectfully submitted,

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Claims appendix

30. A method for stabilizing a vehicle combination of a trailer or semi-trailer and a towing vehicle having front wheels and rear wheels, said method comprising:

determining and evaluating at least one dynamic movement input variable;

implementing at least braking interventions for stabilizing a dynamic movement state of the vehicle combination for the towing vehicle when a rolling movement of the vehicle combination is detected upon evaluating the at least one dynamic movement input variable;

producing a yaw moment that counteracts the rolling movement of the vehicle combination by braking interventions applied to the front wheels of the towing vehicle; and

implementing braking interventions at the rear wheels of the towing vehicle that effect essentially constant braking at the rear wheels only when a predefined operating state of the vehicle combination is present.

31. The method as claimed in Claim 30, wherein the predefined operating state of the vehicle combination is present if a rolling movement of the vehicle combination is detected when there is no braking by the driver and the vehicle combination is located on an underlying surface with a low coefficient of friction.

32. The method as claimed in Claim 30, wherein the predefined operating state of the vehicle combination is present if a rolling movement of the vehicle combination is detected, when there is no braking by the driver, and when the braking interventions applied to the front wheels cause a risk of the front wheels locking.

33. The method as claimed in Claim 30, wherein braking interventions are implemented at the rear wheels if a rolling movement of the vehicle combination is detected, when there is no braking by the driver, and when the vehicle combination is located on an underlying surface with a low coefficient of friction.

34. The method as claimed in Claim 30, wherein braking interventions are implemented at the rear wheels if a rolling

movement of the vehicle combination is detected, when there is no braking by the driver, and when the braking interventions applied to the front wheels lead to a risk of the front wheels locking.

35. The method as claimed in Claim 30, wherein the predefined operating state of the vehicle combination is present if a rolling movement is detected during a driver initiated braking process, and when vehicle deceleration occurring as a result of the driver initiated braking process fulfills a predefined comparative criterion.

36. The method as claimed in Claim 30, wherein the predefined operating state of the vehicle combination is present when a rolling movement is detected during a driver initiated braking process and vehicle deceleration, occurring as a result of the driver initiated braking process, fulfills a predefined comparative criterion.

42. The method as claimed in Claim 30, wherein the braking interventions applied to the front wheels give rise to braking forces composed of basic force and dynamic force components.

43. The method as claimed in claim 30, wherein:

at least the towing vehicle is equipped with one of a hydraulic, an electrohydraulic, a pneumatic, and an electropneumatic brake system; and

the braking interventions which are applied to the front wheels are such that a brake pressure which is composed of a basic pressure and dynamic pressure peaks is supplied to wheel brake cylinders assigned to the front wheels.

44. The method as claimed in Claim 42, wherein a yaw moment which counteracts a rolling movement of the vehicle combination is produced by the dynamic force component.

45. The method as claimed in Claim 42, wherein a value of the basic force component or pressure is determined as a function of a deviation in a yaw angle rate that results from the difference between the actual value for the yaw angle rate determined using a yaw angle rate sensor and a setpoint value for the yaw angle rate determined using a mathematical model.

46. The method as claimed in Claim 42, wherein the value for the dynamic force component is determined as a function of a variable which describes a change over time of a deviation in the yaw angle rate.

47. The method as claimed in Claim 43, wherein both the basic pressure and the dynamic pressure peaks decrease as the rolling movement decreases.

48. The method as claimed in Claim 30, wherein:

engine interventions are also carried out in addition to braking interventions; and

a moment which is output by the engine is set by way of the engine interventions in such a way that substantially no circumferential forces occur at driven wheels of the towing vehicle.

49. The method as claimed in Claim 30, wherein:

engine interventions are carried out in addition to braking interventions; and

torque which is output by the engine is set by the engine interventions in such a way that friction losses which occur in the drive train are compensated and driven wheels are given a neutral setting as far as the circumferential force is concerned.

50. The method as claimed in Claim 30, wherein:

after stabilizing braking interventions have been initiated, it is checked whether instability of the vehicle combination decreases;

when the vehicle combination has returned to a stable state, no further stabilizing braking interventions are produced; and

at the same time drive torque is set in accordance with a value which is predefined by the driver and which can be derived from the activation of the accelerator pedal.

51. The method as claimed in Claim 30, wherein braking interventions are carried out at the front wheels as a function of one of a value of sensed yaw moment which acts in the vehicle and a value of the sensed yaw acceleration.

52. The method as claimed in Claim 30, wherein at least a yaw angle rate of the towing vehicle is determined and evaluated as a dynamic movement input variable.

53. The method as claimed in Claim 30, wherein vehicle speed, yaw angle rate and steering angle are evaluated to determine whether a rolling movement is occurring.

54. The method as claimed in Claim 53, wherein a rolling movement is occurring if the yaw angle rate exhibits an oscillating behavior in an operating state of the vehicle combination in which the vehicle speed is higher than an associated threshold value, even though the driver is not making any steering interventions.

55. The method as claimed in Claim 30, wherein the presence of a rolling movement of the vehicle combination is detected as a function of a deviation variable which includes a deviation between actual value of the yaw angle rate and an associated setpoint value.

56. A device for stabilizing a vehicle combination comprising a trailer and a towing vehicle that has front wheels and rear wheels, said device comprising:

means for determining and evaluating at least one dynamic movement input variable;

means for implementing at least braking interventions at the front wheels of the towing to stabilize a dynamic movement state of the vehicle combination when a rolling movement of the vehicle combination is detected upon evaluating the at least one dynamic moment input variable;

wherein a yaw moment that counteracts the rolling movement of the vehicle combination is produced by the braking interventions at the front wheels of the towing vehicle;

wherein braking interventions for the rear wheels of the towing vehicle that effect essentially constant braking at the rear wheels are additionally permitted only when a predefined operating state of the vehicle combination is present.

Evidence appendix

None.

Related proceedings appendix

None.